

Apple Production Method and Process

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Abstract

Our research Paper “Apple Production Method and Process” is an Afghanistan's climatic conditions are exceptionally good for some, mild tree crops. There are an enormous number of endemic plant species like. Wide scope of agro ecological zones gives a long period of reliable stock. Afghanistan is an interesting focal point of hereditary variety and of incredible worth to the global agriculture local area. Cherry, plum, apricot, peach, pear, apple, pecan, pistachio, fig, grape, pomegranate, almond, are among the species present the nation over. Green harvests are generally water efficient, add to critical creation broadening and are a wellspring of much required supplements for the populace. Cultivation is land and work concentrated which is a benefit for helpless ranchers. Thinking about the provincial standing for excellent produce, cultivation turns into a hotspot for send out income. As indicated by Finet (2010) Afghanistan is fundamentally have a bigger region under calm natural products. Agriculture possesses 2.7% of the absolute developed region, 55% of organic product crops, 40% of vegetables and 5% of different items. The fundamental organic product crop in regards to region is grape with 51%, trailed by almond with 11%, apricot 5.7% and apple 5.1%. Grape (new grape and raisin) is the most spread species in the country (14 territories out of 27) and is by enormous by worth and volume, the greatest enduring organic product crop.

Key: Wide Scope, Ecological Zones, Global Agriculture, Organic Product, Cultivation.

Climatic conditions

Environment is differed going from semi-parched, calm, dry mild with seven agro biological zones (NEM, CM, EM, SM, NM, TP, HLL and HRV). Temperatures are - 30 to 490C in winters and summers individually offer a few chances to develop organic product crops. Yearly precipitation goes from < 100 to 1000 mm. Geological rises shifted from 2000 to 4000 m above mean ocean level (amsl). Soils are generally sandy to sandy topsoil (low in natural carbon, N and P and medium in K).

Region, creation and efficiency

During year 2011 (FAO), the apples were become over a space of 8.87 thousand hectares with a development of 59.47 thousand tons and normal usefulness of 6.71 t/ha. While the necessity of calm organic products at present multiple times. Albeit complex expansion in region, creation and efficiency recorded however contrasted with normal world usefulness just as usefulness of cutting edge nations, Afghanistan's position is a long ways behind the development nations whose efficiency has gone up to 40.5 t/ha. There are a few reasons for low usefulness.

Reasons for low efficiency in Afghanistan

Plantations by and large have low efficiency, quality and yield because of a few existing social issues, which are normal to most organic product crops, as follows:

Absence of value establishing material, because of the absence of nurseries with rootstocks and cultivars mother plants. Inappropriate plant dividing, frequently under high thickness establishing concealing happens on lower branches and within the plant, hence diminishing trimming volume and driving the editing region to the upper piece of the overhang.

Absence of right information about preparing and pruning rehearses.

1. Traditional flood water system frameworks give over the top volumes of water and regularly not at the proper time.

2. Incorrect intercropping the board, with unnecessary development of the dirt around tree stems, subsequently wounds of the roots and trunks.

3. Inappropriate manures are utilized because of the absence of soil investigations; low degrees of nitrogen are applied; the micronutrient status of mature plantations requires checking.

4. Lack of windbreaks brings about tree twisting and yield misfortunes because of wind harm to branches, shoots and natural product.

5. Low fertilization by honey bees in diminishes organic product setting, bringing about little and unpredictable organic products.

6. Disease anticipation medicines are sporadic, diminishing quality and amount of creation.

7. Lack of right gathering and dealing with diminishes the quality and the capacity time of the organic product. The post-gathering innovation (bundling, cold-chain, obsolete handling, and so forth) is poor, restricting the presentation of commodity.

Strategies for increasing productivity and quality of apple.

There are number of approaches to increase the productivity and quality of apple includes:

1. Integrated orchard management
2. Integrated cultivar management
3. Integrated manure and fertilizer management
4. Integrated water management
5. Integrated weed management
6. Integrated management of other insect pest and diseases

Integration of above approaches includes many aspects related to apple production from propagation to harvest of the crops. The details are briefly explained as below:

Propagation

Seed Propagation: For germination of seeds it requires delineation (60-120 days at 3-5 0C) to break the lethargy. This strategy is by and large used to raise half and half seeds just as seedling creation.

Stooling or layering:

Stooling or layering, methods are followed utilizing soil, sawdust/peat, or covering with an obscure material like plastic. Saw cleans are frequently utilized for earthing-up stool/layer beds. Utilization of ethephon @ 300 mg/litter in mid-June expanded the quantity of established shoots on stool beds. It is exceptionally effective in rootstocks like V5-38, MM. 111, M.26, Budagovsky 118, MM. 106, Morden 56-4, M.4, B.490, B.491, M.27, B.54-233,

Alnarp2, M.7, Jerk 9, Robusta 5, P. 18, P. 16, Mark, and B.54-146 when contrasted with M.9, P.22, B.9, P.2, P.I, Ottawa 3, and M.20.

Hardwood Cuttings: The cuttings taken from stock plants in the torpid season are appropriate for hardwood cutting. Use of IBA 2500 mg/litter is compelling; Phloridzin and phloroglucinol are likewise synergistic with IBA to work on the establishing. Temperatures of 21C were viewed as generally appropriate. **Miniature proliferation:** Over the most recent 20 years better than ever miniature spread procedures have been produced for some, rootstocks including the apple clones M.9, M.26, M.27, and MM. L1.

Chilling prerequisite

Chilling unit in calm natural product creation is a measurement of a plant's openness to chilling temperatures (7 C) and it might change from sticking to 16C. Apple trees create the following year's buds in the late spring. Apple cultivars have an assorted scope of chilling prerequisites.

Rootstocks

Rootstocks and propagation is the main backbone of apple cultivation. Different vigour controlling rootstocks along with resistance to biotic and abiotic stress are available.

Table 1. Important clonal rootstocks with salient characteristics

Rootstocks	Salient features
EMLA 111/ MMIII	Suit to drought prone areas
EMLA.7	Suit to sloppy, virgin lands, semi vigorous
EMLA.106/MM.106	Suit to sloppy, and less clay soils, semi vigorous
EMLA 9/M9	For high density planting with assured irrigation and deep fertile soils, very dwarf
M 779	For hilly areas

Dwarfing rootstocks: B-490, B-491, J-9, M-7, M-9, M-26, M-27, MAC-1, MAC-9, MAC-39, MM-106, O-3, O-8, OAR-1, P2, P18. *Cold hardy rootstocks:* B-491, B-490, B-9, O-3, P-2, P-18, P-22, K-14, Novole, Alnarp 2, Robusta 5, *High temperature tolerant rootstocks:* M-7, MM-109. *Drought tolerant rootstocks:* MM-111, KC-1, KC-1-48-41. *High soil moisture tolerant rootstocks:* MM-116, M-7, MM-104. *High soil pH tolerant rootstocks:* M-9, MM-106. *Disease resistant rootstocks, esistant to powdery mildew:* P series (P 1, P2, P 16, P-18, *Resistant to crown and root rot:* B-9, B-491, MAC-9, O-3, P-2, No vole, G-30, G-65. *Resistant to latent viruses:* OH series, B-9, MAC-9, C-6, No vole

Table 2. Propagation propensities of clonal rootstocks

Propagation propensity	Rootstock	Remarks
Excellent	MM 101, MM 104, MM 105, MM 109, M III, M IV, M V, M IX, M XIII	These rootstocks are propagated very easily and readily
Good	MM 102, MM 106, MM 110, MM 111, MM 112, MM 115, M I, M II, M VII, M XVI, M XX, M XXI, M XXV, M 26	These rootstocks are sufficiently productive to become readily available

Fair	MM 103, M VIII, M XII, M XVII	These rootstocks are not propagated so readily as those in the preceding groups but are fairly productive
Poor	MM 113, MM 114, M XVIII, Crab C	These stocks root poorly in the stool beds

Cultivars

Apples are accessible in an extraordinary cluster of shadings, sizes, and flavors. Furthermore, they change in their cooking or crisp eating characteristics, stockpiling life, tree solidness, bug powerlessness, and numerous different attributes. Purchasers ought to think about cautiously the various qualities of every cultivar prior to buying and establishing apple trees. Business orchardists likewise should consider possible usefulness, buyer inclinations, showcasing potential, and fertilization necessities when arranging a plantation.

Most apple cultivars are self-unfruitful; they require cross fertilization from a subsequent cultivar to guarantee satisfactory natural product set and great creation. A few apples, like Jon gold, are triploid and don't create great dust; these require establishing two unique cultivars for fertilization in case the pollinators are likewise bear organic products. Crab apples are a viable dust hotspot for all apple cultivars, if they blossom simultaneously. Most took on apple cultivars for business development incorporates Oregon Spur, Red Chief, Well Spur, Vance Delicious, Hardy Spur, Gold Spur.



High density orchard on MM 106 rootstock

High density orchard on M 9 rootstock

Silver Spur

Oregon Spur

Starkrimson

Red Fuji

Pollination management

In apple self-inconsistency requires the guaranteed fertilization by honey bees. Indeed, self-viable assortments are more useful in presence of guaranteed pollinators. A scope of pollinizers cultivars is accessible, other than pollinizers, situation of bumble bee hives in plantations as pollinators not just expands fertilization, organic product set and natural product yield yet additionally turns out extra revenue through honey. For plantations with <15% pollinizers, 8 hives; plantations with >30% pollinizers, 2-3 hives and for high thickness

plantations, in view of more plant thickness per unit and higher sprout thickness of spike type cultivars 5-8 hives are suggested.

Shelter the board

Shelter the board decides the yield and nature of apple organic product which is a resultant of simplicity of execution of proficient plantation the executives rehearse, better light block attempt and circulation at tree just as plantation scale. As a general rule, 70% light is caught by tree shelter and rest 30% strikes plantation floor. Perceptions uncovered that over 30% full radiation is helpful for prod advancement and blossom inception. By and large, a plantation with under 30% light capture is low in efficiency in contrast with a plantation with 50-70% light block attempt.

Customarily changed and open focus preparing frameworks are polished. High thickness estate frameworks includes ability and thusly specific preparing framework must be embraced by the orchardist to augment the accessible land use proficiency just as capability of any suggested cultivars for close planting. Such methodologies upgrade the tree proficiency and intelligence as well as effectively sensible with generally excellent natural product quality.

Pruning and Training

Mature apple tree structure and design have been kept up with by pruning. Tree preparing, be that as it may, is a substantially more proficient and positive method for creating structure and design. Pruning is the expulsion of a piece of a tree to address or keep up with tree structure. In preparing tree development is coordinated into an ideal shape and structure. Preparing youthful organic product trees is fundamental for legitimate tree improvement. It is smarter to coordinate tree development with preparing than to address it with pruning. Pruning is frequently done throughout the colder time of year, normally alluded to as lethargic pruning. Preparing incorporates summer preparing and summer pruning just as lethargic pruning. The objective of tree preparing is to coordinate tree development and limit cutting.

Table 3. Training systems for high and ultra-high density

Characteristic	Freestanding Central Leader	Vertical Axis	HYTEC (Hybrid Tree Cone)	Slender Spindle
Tree height (m)	3.7-4.25	3.0-4.25	2.75-3.35	2.0-2.5
Tree spread at the base (m)	2.75-3.35	1.5-2.1	1.5-2.1	0.9-1.5
In-row spacing (m)	3.0-4.5	1.5-1.8	1.5-1.8	1.2-1.5
Between-row spacing (m)	4.5-6.7	4.0-4.5	3.35-4.25	3.0-3.66
Density (trees/acre)	132-290	500-700	500-900	700-1,000
Rootstocks	M.7, MM.106, MM.111	M.9, M.26, M.7	M.9, M.26	M.9
Support system required	no	yes	yes	yes
Yield expectations, years 2-4	low	medium to high	high	high
Yield expectations, years 5-10	medium	high	high	high

Central leader pruning	headed annually	no pruning	remove to a weaker lateral; may head or snake depending on tree vigor	remove to a weaker lateral
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Table adapted from Intensive Orchard Management, by Bruce H. Barritt, Good Fruit Grower, Yakima, Wash., 1992.

Orchard design and plant density depends upon the growing region, climate, topography, cultivar and rootstock. In India, in apple planting density from 625 to 2500 trees per hectare is recommended for higher yield.

Table 4. Summary of high density orcharding systems in apple assessed at various places in India and abroad

Variety	Rootstock	Training system	Spacing (m)	Density (Rees/ha)	Yield (t/ha)	Reference (country)
Empire	M-26	Y-trellis	2.1 x 3.7	1283	275.0	Robinson et al. 1991
Granny Smith	EM-9	V- shape	0.4 x 3.5	7140	210.0	-
Red Delicious	M-26	Y-trellis	-	960	130.0	-
Red Delicious	M-26	Y-trellis	2.4 x 4.3	961	122.0	Robinson et al. 1991
Red Delicious	M-9	Slender spindle	-	1495	95.0	-
Fuji	M-26	Spindle bush	2.0 x 4.0	1250	88.00	
Marshal McIntosh	M-9	Slender spindle	1.7 x 4.0	1429	60.0	Wunsche and Lasko 2000 (USA)
Golden Delicious	M-9	Central leader	1.5 x 3.0	2222	47.4 (8 th year)	CITH Annual Report, 2010 (India)
Vista Bella	M-9	Central leader	1.5 x 3.0	2222	42.5 (8 th year)	CITH Annual Report, 2010 (India)
Golden Delicious	MM-106	Central leader	2.5 x 3.5	1143	39.5 (8 th year)	CITH Annual Report, 2010 (India)
Mollies Delicious	M-9	Central leader	1.5 x 3.0	2222	35.5 (8 th year)	CITH Annual Report, 2010 (India)
Red Fuji	EMLA-111	Modified leader	3.0 x 3.0	1111	16.9 (9 th Year)	Bhatia & Kumar, 2009 (India)

Scarlet Gala	EMLA-111	Modified leader	3.0 x 30.0	1111	15.6 (9 th year)	Bhatia & Kumar, 2009 (India)
Oregon Spur	MM-106	Modified leader	2.5 x 2.5	1600	13.2 (7 th year)	Verma, 2009 (India)
Red Chief & Silver Spur	MM-106	Modified leader	2.5 x 2.5	1600	12.6 (7 th Yr)	Verma, 2009 (India)
Vance Delicious	M-7	Modified leader	4.0 x 4.0	625	12.1	Rana and Bhatia 2004
Oregon Spur	EMLA-106	Modified leader	1.5 x 3.0	2222	47.5 (9 th year)	Sharma et al. 2004

Fruit set and chemical thinning

Fruit thinning is a important management practice that reduces yield in the current season but improves fruit size and also increase return bloom and yield in the next season. Several chemical thinning agents are recommended as per below details.

Chemical	Concentration	Stage of application
Naphthalene Acetic Acid (NAA)	5-10 ppm	At 10-12 mm fruit size stage
Naphthaneacetamide (NAD or NAAM)	25-50 ppm	At petal fall
6- Benzyl Adenine (BA)	35-150 ppm	At 10-12 mm fruit size stage
Carbaryl	1.0 to 4.0 g A.I./4.5 litre	Petal fall to 20 mm fruit size

Integrated nutrient management

The development capability of apple trees and to support the improvement drives for Hitch cultivation, nourishing administration assumes a key part. The plant supplement insufficiency and overabundance are the main pressing issues. In this way, it becomes significant that we comprehend our property put to natural product development for example land quality, fruitfulness, slant and area of the plantation. Overall apple plantation yielding 25 t/ha on a normal eliminates 100 kg nitrogen, 45 kg phosphorus and 180 kg potassium every year.

Natural excrements

Excrement contains useful natural matter and numerous full scale and micronutrients. The natural nitrogen in excrement is mineralized after some time, giving nitrogen in decreasing amounts to quite a long while. Significant composts incorporate FYM, vermicomposting and bio manures.

Compound manures

To keep up with soil richness the dirt is to be enhanced by the expansion of substance composts. Nitrogen builds development and power of the tree. It is needed for the organic product bud development, organic product set and natural product size. Phosphorus is fundamental supplement to fortify the root framework and for the root extension. Potassium is

fundamental for the assembling and movement of sugar and starches. A 10 years mature apple trees requires 100 kg FYM (December), 1.5-2.0 kg (December) super phosphate.

Fustigation

Fustigation offers the possibility to conquer the low ripeness of soils by convenient conveyance of key supplements to the primary establishing zone in plantations. Productive utilization of N, nonetheless, relies on decreasing exorbitant seepage of the water and further developing N take-up. Furthermore, conveyance of more stationary supplements, for example, P and K straightforwardly to the roots is worked with when these supplements are provided in arrangement. The suggested numbers and release of drippers/miniature planes/miniature sprinklers in apple with plant to plant and column to push separating of 15 x 15 ft.; 4-drippers per plant with 4-liters each hour release under loamy and earth loamy soils; 3-drippers per plant with 4-liters release each hour under mud soils; 2-miniature fly per plant of half circle type with low release; one miniature sprinklers for every plants at 40 litters of pinnacle water necessity each day per plant.

Integrated water management

Appropriate water system is fundamental to keeping a solid and useful apple plantation. Over water system eases back root development, builds the potential for iron chlorosis on antacid soils, and drains nitrogen, sulphur and boron out of the root zone prompting supplement inadequacies. Unnecessary soil dampness likewise gives a climate ideal to crown and collar spoils. Over water system can likewise incite unreasonable vegetative energy. Applying lacking water system water brings about dry season pressure and diminished natural product quality.

Incorporated weed the executives

In apple plantations, yearly, biennial and perpetual weeds are developed. They go after dampness, supplements and harbour numerous creepy crawly bug and sicknesses by establishing cool and moist environment. Along these lines, controlling weeds augments plantation usefulness. The basic phases of weed control are blooming, organic product set, organic product improvement, blossom bud commencement and solidifying off and subsequently weed control should be attempted from bud break to July.

The board of these weed species are a troublesome undertaking. In any case, clean development, hand weeding, cultivator and spud out the weeds are normal techniques. Splash of glyphosate (Roundup) @ 4 ml/litter of water is exceptionally successful to control these weeds. Pre-development herbicides ought to be applied in the late-winter or fall before yearly weeds arise. Post emergence herbicide viability diminishes as weeds develop.

Integrated pest and disease management

Irritations and sicknesses in apple are making weighty misfortunes a degree of around 30-40 % other than impeding their quality and subsequently there viable administration is most fundamental part for expanding creation and usefulness of value apples. A coordinated methodology incorporates social, mechanical, organic and compound strategies for effective administration of bug vermin and sicknesses in apple.

European Red Mite: Both the youthful and grown-up suck the plant sap from leaves and other delicate parts and cause introductory specking on leaves and at later stage the leaves becomes earthy green tone and fall rashly. Treat the plants at pink bud stage and after one month with blend of plantation shower oil (2%) with linden 20% EC (0.05%) to forestall egg bring forth and splash dicofol 18.5 EC (0.05%) or wettable sulphur 0.25% at pink bud stage and some other time when the vermin populace surpasses 15-20/leaf.

Yield guideline and pre-collect administration

Further developing natural product set: Use 3% Dormex (hydrogen cyanimide) 40 days before bud break Boric corrosive (1%) at the hour of sprout can help in better dust tube development. Shower of Miraculan (0.75 ml/L water) or Paras (0.6 ml/L water) or Biozyme or Protozyme (2 ml/L water) at bud swell and petal fall stages has been suggested for better natural product set (Anonymous, 2003).

Diminishing: Hand diminishing of bloom bunch after each 3-4 group or holding just 2-3 fruitlets for every bunch is rehearsed. At petal fall stage NAA 10ppm (1ml planofix/4.5L water) 7-15 days after petal fall or at organic product length around 15 mm is best. Carbaryl @0.075% (Sevine 50WP/L water) 7-10 days after petal fall and Ethephon(100-200ppm) at full sprout to petal fall is likewise successful.

Fruit drop: The use of 10 ppm NAA (Planofix 1ml/4.5L water) seven days before the normal organic product drop or 20-25 days before collect can check the organic product drop viably.

Organic product tone and development: Application of 250-500ppm 2-chloroethyl phosphonic corrosive (Ethrel, CEPA or Ethephon) around 20 days before gather further develops shade of natural product generously yet weakens timeframe of realistic usability.

Development lists and gathering: Maturity files/reaping stage decide the nature of products of the soil time span of usability. Development guidelines have been determined and normalized dependent on days to gather from full sprout and TSS in apple. Regal Delicious, Red Gold, Rich a Red, Red Delicious and McIntosh are prepared to gather following 120-135 days from the date of full sprout with T.S.S. going from 12-14 oBrix.

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